

Appn No. 10/815,526
Amdt date March 23, 2009
Reply to Office action of November 24, 2008

Amendments to the Claims:

This listing of claims will replace all prior versions, and listings, of claims in the application:

Listing of Claims:

1. (Currently Amended) Process for forming a protective coating containing aluminium on the surface of a ~~metal substrate~~ nickel-based superalloy in which the nickel-based superalloy substrate and a non-gaseous precursor containing aluminium are placed in contact, at a treatment temperature sufficient for stoichiometric coating, with [[an]] a reducing or inert atmosphere containing an active gas which reacts with the precursor to form a gaseous aluminium compound which decomposes on contact with the nickel-based superalloy substrate depositing aluminium metal thereon, characterised in that the reducing or inert atmosphere contains a gaseous compound of a modifier metal which decomposes on contact with the nickel-based superalloy substrate and deposits the modifier metal thereon simultaneously with the deposition of aluminium, wherein the gaseous compound of the modifier metal is zirconium oxychloride such that zirconium metal is deposited simultaneously with the deposition of aluminum.
2. (Cancelled)
3. (Previously Presented) Process according to claim 1, in which the active gas at least in part comprises the gaseous compound.
4. (Previously Presented) Process according to claim 24, in which the active gas at least in part comprises the gaseous compound.
5. (Previously Presented) Process according to claim 3, in which the active gas solely comprises the gaseous compound.
6. (Previously Presented) Process according to claim 3, in which the active gas also contains at least one ammonium compound.

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7. (Previously Presented) Process according to claim 1, in which the active gas and/or the gaseous compound are formed by the vaporisation of at least one substance which is solid at ambient temperature mixed with the precursor.

8. (Currently Amended) Process according to claim 1, in which the nickel-based superalloy substrate contains at least one element which combines with the aluminium to form an intermetallic compound within the coating in which the aluminium is partly substituted by the modifier metal.

9. (Previously Presented) Process according to claim 8, in which the element of the substrate is nickel and the intermetallic compound is β -NiAl.

10. (Canceled)

11. (Canceled)

12. (Canceled)

13. (Currently Amended) Process according to claim [[11]]20, in which the active gas contains at least one compound selected from NH₄Cl, NH₄F and NH₄F, HF.

14. (Previously Presented) Process according to claim 1, in which the active gas contains at least one compound selected from NH₄Cl, NH₄F and NH₄F, HF.

15. (Previously Presented) Process according to claim 1, in which the precursor is an alloy of aluminium and chromium.

16. (Original) Process according to claim 1, in which the substrate and the precursor are at a distance from each other.

17. (Original) Process according to claim 16, in which the substrate is located above the precursor.

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18. (Original) Process according to claim 1, in which the substrate and the precursor are in contact.

19. (Original) Process according to claim 1, in which the substrate and the precursor are located in an enclosure permitting only limited exchanges with the exterior.

20. (Currently Amended) Process according to claim 1, in which in addition to the active gas and the gaseous compound, the reducing or inert atmosphere comprises an ~~inert or~~ reducing gas.

21. (Previously Presented) Process according to claim 1, in which the modifier metal is present in the protective coating in a concentration by mass of less than 0.5%.

22. (Previously Presented) Process according to claim 21, in which the concentration by mass lies at or above 500 ppm and below 1000 ppm.

23. (Previously Presented) Process according to claim 1, in which the treatment temperature is about 1080°C.

24. (Currently Amended) A method for forming a protective coating containing aluminium on a surface of a ~~metal substrate~~ nickel-based superalloy, the method comprising:

placing the ~~metal substrate~~ nickel-based superalloy and a non-gaseous precursor containing aluminium in contact, at a treatment temperature sufficient for stoichiometric coating, with [[an]] a reducing or inert atmosphere containing an active gas;

reacting the reducing or inert atmosphere containing the active gas with the non-gaseous precursor containing aluminium to form a gaseous aluminium compound;

decomposing the gaseous aluminium compound on contact with the ~~metal substrate~~ nickel-based superalloy and depositing aluminium metal on the ~~metal substrate~~ nickel-based superalloy, wherein the reducing or inert atmosphere further comprises a gaseous compound of a modifier metal; and

decomposing the gaseous compound of the modifier metal on contact with the ~~metal substrate~~ nickel-based superalloy and simultaneously depositing the modifier metal on the ~~metal~~

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substrate nickel-based superalloy with the depositing of the aluminium metal, wherein the gaseous compound of the modifier metal is zirconium oxychloride such that zirconium metal is deposited simultaneously with the depositing of the aluminum metal.

25. (Previously Presented) The method of claim 24, wherein the active gas consists of the gaseous compound of the modifier metal.